UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/839,044	04/20/2001	Katherine H. Cornog	A01004	3631

26643 7590 03/23/2007

PETER J. GORDON, PATENT COUNSEL
AVID TECHNOLOGY, INC.
ONE PARK WEST
TEWKSBURY, MA 01876

EXAMINER	
EDWARDS, PATRICK L	
ART UNIT	**PAPER NUMBER**
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/839,044	CORNOG ET AL.	
	Examiner	Art Unit	
	Patrick L. Edwards	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 17-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14, 17-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The response received on 12-15-2006 has been placed in the file and was considered by the examiner. An action on the merits follows.

Response to Arguments

2. The arguments filed on 12-15-2006 have been fully considered. A response to these arguments is provided below.

Prior Art Rejections

Summary of Argument:

(A)

Applicant alleges that Sasaki does not disclose "computing an estimate of motion of the desired characteristic between the two images using a gradient-based method and using the single channel images generated." Specifically, applicant argues that Sasaki uses a gradient only for edge detection and not for motion estimation (see remarks pg. 6).

Examiner's Response:

Applicant's arguments have been fully considered but are unpersuasive. Sasaki describes calculating optical flow. Optical flow is the motion of an image. Optical flow describes the direction and the speed of the features in an image. The optical flow has two components: the x-direction and the y-direction. This is seen in the formulas at col. 5 lines 41-49 . These formulas qualify as gradients and the motion estimation consequently qualifies as gradient based.

The examiner is familiar with literature on optical flow techniques, and agrees that a more specific description of a particular gradient based method might overcome Sasaki. But here, the specification merely mentions the term gradient-based, but does not provide a definition of what a gradient-based method entails.

The PTO is charged with the responsibility of giving claims their broadest reasonable interpretation. Sasaki anticipates this claim in that it performs motion estimation which is based on an operation that qualifies as a gradient.

(B)

Applicant further alleges that Sasaki does not disclose a method that "uses as a constraint that a total of the desired characteristic is constant from one image to the next image where the desired characteristic is something other than luminance alone." Applicant argues that the examiner has erroneously relied upon Marshall for this teaching (see remarks pg. 8).

Examiner's Response:

Applicant's arguments have been fully considered but are unpersuasive. The examiner does not recall relying on Marshall for this feature. The examiner simply has to look to applicant's own disclosure to refute applicant's allegations. Paragraph [0045] of applicant's disclosure states that:

> *By processing the input images to determine edge magnitude, and processing optical flow on the edge magnitude of the input images, the effect is that optical flow is computed based on a constant edge constraint as opposed to a constant brightness constraint.*

Sasaki unqestionably processes input images to determine edge magnitude, and then processes optical flow on the edge magnitude of the input images. Thus, by applicant's own admission, this limitation of the claim is met by Sasaki.

(C)

Applicant disagrees that claim 19 fails to further limit claim 1. Applicant alleges that claim 1 does not recite the limitations of claim 19

Examiner's Response

Claim 1 recites the step of computing motion estimation using a gradient based method. A gradient based motion estimation method inherently computes vectors that describe the motion from one image to the next.

The examiner is persuaded tha the the claim 19 limitation that a vector is computed for each pixel in the image arguably further limits claim 1. However, even if this does further limit the claim, it does not do so in a fashion substantial enough to overcome Sasaki—who discloses determing optical flow for all pixels of an edge image (see col. 7 lines 5-18).

(D)

Applicant traverses the 103 rejection to claims 3, 7, 10, and 14. Applicant alleges that Kobilansky fails to teach the generation of a single channel image (see remarks pg. 9)

Examiner's Response:

Applicant's arguments have been fully considered but are unpersuasive. The examiner would like to respectfully remind applicant that this rejection was over a combination of references and not just a single reference along. The examiner never indicated that Kobilansky was drawn to the generation of a single channel image. Rather, Sasaki teaches generating a single channel image on the basis of a desired characteristic—specifically, edges. Sasaki teaches that edges are used because they are useful in determining motion between two images. In that same vein, Kobilansky teaches that proximity to a color can be a useful characteristic for determining motion between two images. Thus, it would have been obvious for a skilled artisan at the time of invention to try color proximity out as a desired characteristic for generating a single channel image.

Further regarding the limitation from claims 3, 7, 10, and 14, the examiner would like to respectfully apprise the applicant of an amendment alternative that might help advance the prosecution. As appicant is aware, the PTO is charged with the responsibility of giving claims their broadest reasonable interpretation. Here, the broadest

reasonable interpretation of these claims is met by this combination of references. However, the examiner is of the opinion that the applicant could make a step towards overcoming the combination of Sasaki and Kobilansky by clarifying the scope of this particular limitation. Specifically, the limitation of generating a single channel image according to color proximity. For example, there appears to be some slightly more clarifying languuage in paragraphs [0012] and [0017] of applicant's specification. Perhaps these paragraphs could be useful starting point to help the applicant clarify the scope of the claims and avoid a broad interpretation.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 8, 9, 17, and 18-20 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Sasaki et al. (USPN 6,246,961).

Regarding claims 1, 2, and 17, Sasaki discloses generating a single channel image for each of two input images according to a function that measures, for each pixel, occurrence of a desired characteristic, other than luminance alone, in the input images at each pixel location to provide a value for an output pixel in the single channel image from a range of values that represent a likelihood of the occurrence of the desired characteristic (Sasaki col. 8 lines 29-46: The reference describes generating two edge images (i.e. single channel images) which correspond to two input images. Edge images measure the likelihood of an edge (i.e a desired characteristic).).

Sasaki further discloses computing an estimate of motion of the desired characteristic between the two images using a gradient based method using the single channel images generated for the two input images and using as a constraint that a total of the desired characteristic is constant from one image to the next (Sasaki col. 8 lines 29-46: The reference describes detecting optical flow (i.e. a gradient based motion estimation method) between the two edge images (i.e. the single channel images). As is well know in the art—and stated throughout applicant's own disclosure—the optical flow calculation uses a constant constraint between two images. Since these two images represent the desired characteristic, the claim limitation is met. This is confirmed by applicant's own disclosure in several instances (see e.g. at paragraph [0003] and [0045].).

Regarding claim 19, this claim does not appear to further limit claim 1. Accordingly, the Sasaki reference anticipates this claim.

Regarding claims 8, 9, 18, and 20 Sasaki discloses an apparatus for performing the method of claim 1 (see figure 1).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 4-6, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki as applied above, and further in view of Von Brandt (USPN 4,924,310).

Regarding claims 4 and 5, Sasaki discloses detecting a potential collision according to the estimate of motion, but fails to expressly disclose using the motion estimate to performing processing on the image such as interpolation between two images. Von Brandt, however, discloses using a motion estimate to interpolate between two images (Von Brandt col. 1 lines 40-54). It would have been obvious to one reasonably skilled in the art at the time of the invention to modify Sasaki's motion estimation method by using the estimate to interpolate between two images as taught by Von Brandt. Such a modification would have allowed for the reconstruction of missing image frames (Von Brandt col. 1 lines 40-42).

Regarding claim 6, Sasaki discloses that the desired characteristic is ege magnitude. This limitation was discussed in the 102 rejection.

Regarding claims 11-13, Sasaki disclose an apparatus for performing the method (see figure 1).

7. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Sasaki as applied above, and further in view of Kobilansky (U.S. Pat. Pub. No. US2002/0159749 A1).

Regarding claim 3, Sasaki discloses a desired characteristic, but fails to expressly disclose that this desired characteristic is proximity to a color. Kobilansky, in the same field of endeavor of image processing and the same problem solving area of motion estimation, discloses a motion estimation technique that takes into account the proximity to a color (see paragraph [0015]: The reference describes that a region in the target frame should have a color close (i.e. proximity to a color) to the same region in the reference frame.).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Sasaki by having the desired characteristic as proximity to a color as taught in Kobilansky because the use of such a desired characteristic "provides enhancements to the process of estimating motion in image-sequences such as those that originate from motion pictures or television video" (see Kobilansky: paragraph [0004]).

Regarding claim 10, Sasaki discloses an apparatus for performing the method (see figure 1.)

8. Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Sasaki and Von Brandt as applied above, and further in view of Kobilansky (U.S. Pat. Pub. No. US2002/0159749 A1). The arguments as to the relevance of Sasaki and Von Brandt (and Kobilansky) as applied above are incorporated herein.
The limitations of the claim and the motivation to combine references have been discussed in the above two paragraphs. A separate paragraph was required for these two claims because of the different depency.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick L Edwards whose telephone number is (571) 272-7390. The examiner can normally be reached on 8:30am - 5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick L Edwards Art Unit 2624

ple

BHAVESH M MEHTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600